September 23, 2008

Via Electronic Filing

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 Twelfth Street, SW, TW – A325
Washington, DC 20554

Re: Written *Ex Parte* Presentation in WT Docket Nos. 07-195 & 04-356

Dear Ms. Dortch:

On June 20, 2008, the Federal Communications Commission ("Commission") issued a Further Notice of Proposed Rulemaking ("*Further Notice*")[1] in the above-captioned dockets. The *Further Notice* sought comment on the Commission's proposal to combine the 2155-2175 MHz band with the 2175-2180 MHz band to create a 25 megahertz block of spectrum in a reconfigured AWS-3 band, and additionally sought comment on various application, licensing, operating, and technical rules for the 2155-2180 MHz band.

The *Further Notice* provided a detailed roadmap for the development of new and innovative broadband services in a portion of spectrum that has been lying fallow for nearly two decades.[2] In response to the *Further Notice*, numerous parties submitted comments further developing an already full and complete record in this proceeding. Nevertheless, some commenters challenged the Commission's proposal as outlined in the *Further Notice* and claimed that its proposed technical rules were inappropriate. To resolve this perceived problem,

[1] *See Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band; Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz, and 2175-2180 MHz Bands*, WT Docket Nos. 07-195 & 04-356, Further Notice of Proposed Rulemaking, FCC 08-158 (rel. June 20, 2008) ("*Further Notice*").

[2] In 2006, the Commission briefly highlighted the prolonged timeline for establishing AWS-3 rules by stating: "[t]he Commission originally identified the 2160-2165 MHz band for new advanced fixed and mobile services in the 1992 *Emerging Technologies* proceeding and adopted rules and procedures to permit new licensees to relocate existing fixed microwave services from this spectrum band. This band was first identified as suitable AWS spectrum in 2001, as part of the *AWS Notice*." *See Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems*, Ninth Report and Order, 21 FCC Rcd 4473, ¶ 6 (2006).

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these parties urged the Commission to oversee "empirical testing" in this proceeding—a request that was granted by the Commission.[3]

From September 3-5, 2008, the Commission's Office of Engineering and Technology ("OET") observed a series of tests (hereinafter "tests" or "observed tests") conducted by T-Mobile at Boeing's test facility in Seattle, Washington. The observed tests purported to measure the potential for mobile to mobile interference from two-way broadband service in the Advanced Wireless Service-3 ("AWS-3") band to be located at 2155-2180 MHz, adjacent to Advanced Wireless Service-1 ("AWS-1") downlink operations in the 2110-2155 band. Subsequently, OET submitted its observations from the tests into the record in the above-referenced proceedings.[4]

The tests largely confirm the validity of the approach used by the Commission to develop the technical rules that were outlined in the Commission's *Further Notice*. In fact, the tests show that the Commission's proposed rules for the AWS-3 band are more stringent than is necessary to protect adjacent licensees and should be relaxed to ensure the delivery of effective two-way broadband services in the AWS-3 band. In the end, the testing "confirm[ed] M2Z's straightforward claim that TDD operations pursuant to well established FCC and international technical precedent can and should occur in the AWS-3 band."[5]

The tests also raise a fundamental question for the Commission to consider in this proceeding—what is the minimum received signal strength that should be protected for AWS-1 mobile devices? T-Mobile and other opponents of AWS-3 broadband services are arguing for a protection level that would be inconsistent with Commission policy and regulations. As M2Z details below, the minimum protected received signal strength for AWS-1 mobile devices should be set somewhere between -80 and -90 dBm instead of the -105 dBm level sought by T-Mobile and others. A -105 dBm level would represent nearly a 30 fold increase in the protection currently afforded against spurious emissions into the AWS-1 band. Actual spurious emissions at or near -80 dBm from uses such as WiFi, Bluetooth and microwave ovens makes a -105 dBm protection level impractical.

Furthermore, the protection level advocated by M2Z is common for carriers and device manufacturers, and it strikes a technologically neutral balance between broadband operations in AWS-3 and downlink operations in the 2110-2155 MHz AWS-1 band. The same is not true for the protection level proposed by T-Mobile and other opponents of AWS-3 broadband services. Establishing a minimum protected signal strength level at -105 dBm would have a detrimental

[3] *See* "The FCC's Office of Engineering and Technology Announces Testing for AWS-3 Interference," WT Docket Nos. 07-195 & 04-356, Public Notice, DA 08-1995 (rel. Aug. 27, 2008).
[4] *See* Memorandum of Julius P. Knapp, Chief, Office of Engineering and Technology, WT Docket Nos. 07-195 & WT Docket No. 04-356 (submitted Sept. 12, 2008). M2Z congratulates the Commission for its effort to oversee this testing on a timely basis. We are also thankful that the tests and the results were fully open to the public. Permitting an open process has allowed interested parties to monitor the tests and fully examine the results.
[5] *See* Letter from Uzoma C. Onyeije, M2Z Networks, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket Nos. 07-195 & 04-356, at 1 (filed Sept. 3, 2008).

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impact on wireless policy extending far beyond the bounds of this proceeding, and it would essentially exclude the use of spectrally efficient technologies such as TDD in the AWS-3 band.

Although M2Z recognizes that there is a potential for interference at -105 dBm power levels, such interference would represent an extreme case that does not constitute harmful interference and, therefore, should not be the basis for the Commission's technical rules for AWS-3 band. Adopting technical rules to account for such unlikely contingencies would lead to highly inefficient use of spectrum and would not be technologically neutral. There are no sound policy and engineering principles or previous Commission precedents that justify such an extreme level of protection for AWS-1 handsets, nor for one that would be so far beyond what is found in more typical and practical wireless service rules.

Summary of Test Results

The observed tests results confirmed the following:

- The validity of the previous testing performed by ERA Technology, which provided the basis for the decision by Ofcom (the United Kingdom's independent telecommunications regulator) to permit TDD and FDD coexistence using an out-of-band emission ("OOBE") limit of 49 + 10 log (P)—far less stringent than the 60+10 log (P) proposed by the Commission in the *Further Notice*.

- AWS-3 handsets can safely operate at the Commission's standard power limit of +33 dBm without causing harmful interference to AWS-1 operations.

- There are significant flaws in T-Mobile's adjacent channel tests. The observed tests conducted in September suggested that AWS-1 handsets purportedly would experience adjacent channel interference from a transmitting device in the unlicensed band at 2415 MHz (nearly 300 megahertz away from the AWS-1 band). This phenomenon, which can be described as "Infinite Adjacent Band Interference," is simply unrealistic.

This letter explains each of these conclusions and how they logically flow from the test data. The conclusions presented herein are fully supported by the OET's September 12, 2008 submission of the observed test data into the record. The same cannot be said for the September 10, 2008 submission of AT&T, CTIA, MetroPCS Communications, Inc., Nokia Inc., and T-Mobile USA, which pre-dated the Commission's release of data and simply reiterated these parties' earlier, unfounded positions.[6] Similarly, on September 17, 2008, T-Mobile filed an *ex parte* that ignored the "empirical data" it had previously claimed would be determinative, and instead relied on (i) broad and unsupported generalizations concerning the testing and (ii) its own

[6] *See* Letter from Yasmin Karimli, T-Mobile, *et al.*, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket Nos. 07-195 & 04-356 (filed Sept. 10, 2008).

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conclusions drawn from a Monte Carlo simulation that is not available in the record.[7] M2Z has highlighted in Appendix A to this letter several of the logical flaws present in these unsupported filings from the opponents of two-way broadband use of AWS-3.

I. THE RULES OUTLINED IN THE COMMISSION'S JUNE 2008 *FURTHER NOTICE* ARE WELL SUPPORTED

The *Further Notice* articulated a complete set of rules to govern the AWS-3 band. Notably, the *Further Notice* proposed the adoption of a single 25 megahertz block in the 2155-2180 MHz band, to be governed by service rules that would: (1) permit downlink and uplink transmissions in the band; (2) create a single nationwide license for the band; (3) require the licensee to provide free, two-way broadband Internet access service generally consistent with the Commission's data rate and network capacity proposals; (4) require the licensee to allow open devices and open applications with respect to its premium service, and open devices with respect to its free service; (5) set the initial license and renewal terms at ten years; (6) establish network coverage requirements; (7) allow spectrum disaggregation, partitioning, and leasing; (8) resolve mutually exclusive license applications via competitive bidding; and (9) set in-band power and OOBE limits for AWS-3 base and fixed downlink stations.

M2Z believes that, for the most part, these proposed rules are technologically neutral and well supported by the record of this proceeding. For that reason, M2Z generally supported the proposals set forth in the *Further Notice* despite the fact that portions of the proposal diverge in material respects from M2Z's prior positions.[8] Because M2Z recognized that the Commission must establish the rules of the road for AWS-3, we suggested just a handful of modifications to rules proposed in the *Further Notice* rules:

- To avoid limiting consumer choice, the definition of a free service user proposed in Section 27.1191(b)(3) and (f) should be modified to apply on a per-device basis, so that individual consumers may utilize both free and premium services.

- To avoid regulatory uncertainty, the proposed Section 27.1191(b)(3) should be modified to ensure that any Commission reassessment of the free service data rate requirement is done at license renewal.

- To ensure new nationwide competitive entry, the Commission should limit eligibility to participate in the AWS-3 auction to new entrants.

[7] *See* Letter from Howard J. Symons, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket No. 07-195, AWS-3 FCC Meetings Presentation at 6 (filed Sept. 17, 2008).
[8] *See* M2Z Further Notice Comments at 2-3.

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- To ensure regulatory consistency and usability of the spectrum, the Commission should utilize the "standard" 43 + 10 log (P) OOBE limit for AWS-3 mobile devices.

- In light of the fact that mobile-to-mobile intermodulation interference concerns are not present in the AWS-3 band, the power limit for AWS-3 mobile devices should be modified from 23 dBm/MHz to 33 dBm.

Of the five suggested modifications, the final two concern the Commission's technical rules. As demonstrated below, these suggestions are much more in line with the recent testing results than proposals advanced by other parties in this proceeding.

II. THE THESHOLD DECISION FOR THE COMMISSION SHOULD BE SETTING A PROTECTION LEVEL FOR AWS-1 LICENSEES THAT DOES NOT OVERTURN DECADES OF WIRELESS POLICY AND THE RESULTING INNOVATION IN CONSUMER DEVICES

The original T-Mobile test results first reported this past July did not characterize the TDD/FDD interactions for the full range of served signal levels likely to be experienced in an operational setting. Instead, they only focused on the worst case tested by T-Mobile where the desired signal was -90 dBm or below, and determined recommended emission limits from the lowest of these values, -105 dBm. A meaningful analysis must consider interference thresholds and parameters for the entire usable range encountered in a realistic operational setting. The key policy decision for the Commission is determining the proper protection level for AWS-1 licensees. M2Z believes that sound Commission policy would set this protection level so that normal operations in the AWS-1 band are protected and broadband service in the AWS-3 band is workable. If the Commission were to accept T-Mobile's invitation to set the level of protection for AWS-1 operations by reference to the extreme case, the repercussions will be felt far beyond this proceeding. As explained below, the values at which T-Mobile demands protection would require a wholesale revision of a broad range of Commission rules including those that govern operations by Microwave ovens, Bluetooth devices, femto cells and WiFi. That is because T-Mobile's analysis of the test suggests that each of these devices and services, if operated pursuant to current Commission rules, would interfere with T-Mobile's AWS-1 handsets.

T-Mobile's own statements demonstrate that even on its AWS-1 network, which is far from being fully deployed, the -105 dBm level is at best a 5th percentile number that represents an extreme case.

> According to the measurements from Market A in Figure 2, approximately 28% of the cases in the area received the serving cell signal with a RSCP power level of -90 dBm or lower, 7% of the users at -100 dBm or lower, and 3% of cases at -105 dBm or lower. Similar results were measured for Market B in Figure 3, with approximately 26% of the cases in the area

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> received the serving cell signal with a RSCP power level of -90 dBm or lower, 9% of the cases at -100 dBm or lower, and 5% of cases at -105 dBm or lower.[9]

Although T-Mobile conducted its tests at signal levels as low as -105 dBm, it nevertheless, claimed that "these signal levels do not represent extreme or edge-of- cell conditions."[10] However, in this proceeding, Ericsson Inc. and Sony Ericsson have stated that "the typical AWS-1 receiver will have a noise floor of -103 dBm."[11]

The observed tests conducted subsequently in September 2008 analyzed served signals ranging from -105 dBm to -75 dBm. M2Z's position is that the lower range of these levels (*i.e.*, signals below -90 dBm) are not likely to be usable in any event due to existing interference from the ambient environment. To illustrate this point, we developed the table below to analyze existing Commission rules for unwanted OOBE and determine the effective interference that would limit the minimum usable AWS-1 served signal. The analysis consisted of calculations for representative scenarios involving Part 15 devices (Bluetooth and WiFi), Part 18 devices (Microwave ovens) and Part 27 adjacent block AWS base station operators. Table 1 below shows the key parameters applied for the calculations.

FCC Regulation	Calculated Interference Based on Regulatory Limit at Representative Distance	Minimum usable AWS-1 Signal
47 CFR Sections 15.209 and 15.109	-79 dBm at 0.5 meters (distance assumed for Bluetooth, possibly same platform)	-92 dBm
47 CFR Sections 15.209 and 15.109	-85 dBm at 1.0 meters (distance assumed for WiFi, possibly same user)	-98 dBm
47 CFR Section 27.53(g)	-66 dBm at 3 meters (assumed distance from adjacent block Femto cell)	-79 dBm
47 CFR Section 18.305	-85 dBm at 3 meters (assumed distance for a Microwave oven in the same room)	-98 dBm

Table 1 - Effective Minimum Protected Served Signal Calculations Based on Existing Ambient Radiators

The calculations were based on converting the regulatory limit to an effective in-band received interference power within the 3.84 megahertz AWS-1 bandwidth, and adjusting the received power to correspond to the representative distance. We allowed an additional 5 dB for receiver antenna mismatch and body loss, and based the value of the minimum usable AWS-1

[9] *See* T-Mobile Further Notice Comments, Lab Report at 13 (filed July 25, 2008).
[10] *Id.*
[11] Ericsson Inc. and Sony Ericsson Further Notice Comments at 5 (filed July 25, 2008)

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signal on a required -13 dB of desired-to-undesired signal ratio to support call initiation. This latter figure is derived from the T-Mobile tests.

The implications of this analysis are summarized in Table 2, below. The results show that currently authorized devices that are highly likely to be within the representative distances illustrated above would limit the AWS-1 usable served signal to between -85 to -90 dBm. This is consistent with the PCS minimum protected signal ruling invoked during the UWB proceedings. Note that market estimates for Bluetooth chipsets are around 1 Billion units for 2007, and for WiFi near 10 Million. We believe that with this number of potential interference sources operating at the regulatory limits, the likelihood of finding these devices within the representative distances is fairly high.

Impact of Common Local Radiators on AWS-1 at Various Served Signal Levels

Interference Source

AWS-1 Signal Level	Bluetooth @ 0.5 m	WiFi @ 1 m	Adjacent Band AWS @ 5 m	MW Oven @ 3 m
- 105 dBm	Fail	Fail	Fail	Fail
- 100 dBm	Fail	Fail	Fail	Fail
- 95 dBm	Fail	Marginal	Fail	Pass
- 90 dBm	Marginal	Pass	Fail	Pass
- 85 dBm	Pass	Pass	Marginal	Pass
- 80 dBm	Pass	Pass	Pass	Pass

Pass or Fail indicates ability of AWS-1 to initiate call

- **-90 dBm AWS-1 Signal Strength is lowest level protected by current FCC Technical Rules**
- **Consistent with FCC UWB ruling for PCS minimum signal**

Table 2 – Effect of Existing Regulations for Ambient Environment Devices

In addition to the limiting effect of the ambient environment addressed above, a practical analysis must account for a realistic distribution of served signal levels encountered by an AWS-1 subscriber. In light of the fact that T-Mobile's OOBE concerns could only potentially arise in very densely populated areas, it is difficult to see why low signal levels (such as -105 dBm) should be used as a gating factor for authorizing two-way broadband service in the AWS-3 band.

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Despite T-Mobile's contentions to the contrary, using the -105 dBm criteria as the protected signal level for its network would incentivize very poor network planning by AWS-1 licensees and put the AWS-1 operator at a significant competitive advantage with respect to other carriers because of the poor user experience that would result for AWS-1 users.[12] Furthermore, T-Mobile's use of received signal strength based only on its nascent AWS-1 network is problematic, because the network has yet to be fully deployed—and also because of the reality that the handsets used by T-Mobile are multi-banded, thereby allowing these devices to select the strongest possible signal from their spectral options (which, in the case of T-Mobile, would allow the option of using the PCS and AWS-1 bands, while AT&T devices would have the PCS, AWS-1, and Cellular bands to select from).[13]

III. THE RECENT OBSERVED TESTS SUPPORT THE COMMISSION'S FURTHER NOTICE PROPOSALS

There are two key conclusions to be drawn from the observed AWS-3 tests—both of which are dependent on the desired signal strength level. As explained above, M2Z believes that the level of -85 dBm is both realistically what can be expected in actual, operational systems in high traffic-load areas, and that this standard would be consistent with past Commission precedent.

First, excessive OOBE limits that would inhibit two-way broadband operations in AWS-3 are unnecessary to protect adjacent AWS-1 operations. Second, the Commission need not drastically limit the transmit power for AWS-3 consumer devices, as taking such steps would reduce the utility and capability of the AWS-3 band to support two-way broadband operations. The observed tests demonstrate that, with the minor revisions suggested by M2Z to the Commission's AWS-3 mobile OOBE and transmit power proposals in order to make these proposed service rules consistent with Commission precedents in the 700 MHz and BRS/EBS proceedings, the technical rules proposed by the Commission would be appropriate for the AWS-3 band. Adopting the AWS-3 service rules endorsed herein would allow for safe co-existence of AWS-3 service with adjacent AWS-1 operations at realistic -85 dBm desired signal levels.

[12] *See* Christophe Cevallier *et al.* eds., WCDMA Deployment Handbook Planning and Optimization Aspects, Chapter 3, Capacity Planning and Optimization (2006); *see also* Chris Johnson, Radio Access Networks for UMTS: Principles and Practice 543 (2008).

[13] T-Mobile's conclusions in its July 25th Further Notice Comments about the prevalence of interference to AWS-1 from AWS-3 operations, as well as in subsequent T-Mobile filings, are premised on received signal code power (or "RSCP") measurements for AWS-1 from drive-by observation in just two markets. T-Mobile provided this data without context, failing to report with its observations such necessary details as the observed network base station density and whether such density is representative of a fully built network (similar to PCS and Cellular networks). Based on T-Mobile's own public announcements, T-Mobile has only begun to deploy its AWS-1 network. Relying solely on the results from these partially constructed networks would significantly distort the expected received signal strength available under normal operating conditions for AWS-1 capable devices that are able to operate in multiple bands.

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M2Z also notes that the results from the observed tests demonstrate that the adjacent band interference case (previously championed but now downplayed by T-Mobile, AT&T, and others) leads to impractical and implausible results—thereby making the overly broad statements about interference by T-Mobile and others an unreliable basis for Commission policy.

A. THE RELEVANCY AND EFFICACY OF T-MOBILE'S TEST PROCEDURES

The OOBE results from the observed T-Mobile tests are helpful in determining the appropriate technical rules for AWS-3. On the other hand, T-Mobile's flawed Adjacent Channel Interference ("ACI") tests did not separate the effects of the OOBE and adjacent channel interference as described below. These effects need to be measured independently in order to provide clear inputs into a statistical analysis framework (such as the one done by Ofcom) which requires that each criterion be applied separately. Thus, M2Z used the observed OOBE test results and ERA's more reliable adjacent channel interference tests when assessing the Commission's proposed technical rules in the *Further Notice*.

Flawed Adjacent Band Interference Testing

In the observed tests and the original test results that T-Mobile reported in July, a UMTS signal was used to simulate an AWS-3 signal.[14] The test measured the strength of the stand-in AWS-3 signal and the associated frequency offset to inhibit a call setup. The frequency offsets including the AWS-3 band and higher in frequencies were evaluated to confirm the validity of the test technique. The resulting data[15] shows some rather strange effects of frequency offsets. One would expect that the adjacent band power needed to disrupt AWS-1 would increase monotonically and smoothly with increases in offset, becoming very large when the adjacent band was in a totally different radio service. This is because a well designed receiver should almost completely reject signals from bands that are significantly offset from the receive channel. Thus, signals in the 2400-2470 MHz ISM band used for Wi-Fi (and most home microwave ovens) should be rejected completely by the AWS-1 receiver. However, the test data shown in Figure 1 below tells a very different story.

[14] UMTS signals are designed for a full duplex environment and will not even work in unpaired spectrum such as AWS-3. No AWS-3 advocates have ever indicated any interest in using such a signal, and the WiMAX-like signals that are of interest to the AWS-3 advocates have much lower OOBE than UMTS signals.
[15] Results of FCC Public testing for AWS-3 Interference at Boeing test Facility, Ver. 5 at p. 3 and p. 6

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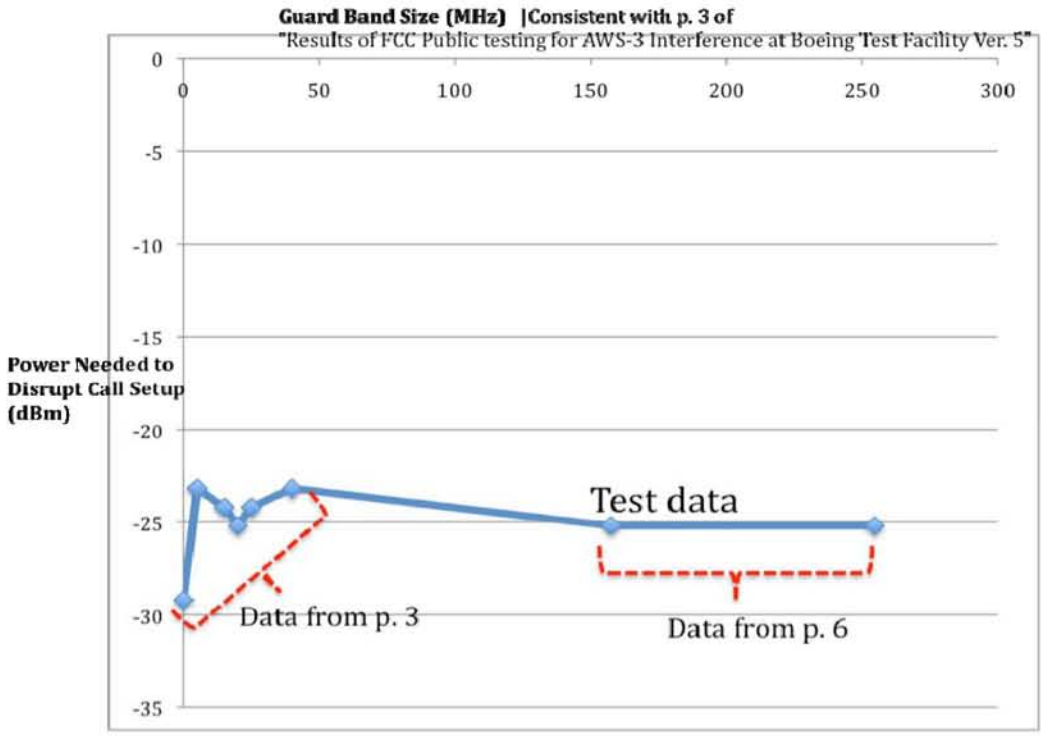

Figure 1: Relationship of power needed to disrupt AWS-1 to "guard band size"

Indeed, the measurements in the tests showed that the power needed to disrupt AWS-1 only increases slightly (4 dB) from the zero guard band case (AWS-3 signal at lower edge of AWS-3 band, centered at 2157.5) to the case where the interfering signal was located in the 2400 MHz ISM band 254.5 megahertz away!

There are two possible explanations:

1. **Improper AWS-1 receiver design**: T-Mobile has admitted that its receiver filter allows signals from up to 2170 MHz to pass through to the rest of the receiver.[16] M2Z tests of two T-Mobile receivers,[17] as along with our review of specifications for commercially available filters, suggests the real upper limit may be 2180 MHz, and the observed test results suggest that the upper limit of the filtering in the T-Mobile receivers may in fact be much higher.

[16] cite
[17] *See* Letter from Uzoma C. Onyeije, M2Z Networks, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Docket Nos. 07-195 7 04-356, Overview of Technical Issues Concerning the AWS-3 Service Rules at 11 (filed July 2, 2008).

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2. **Improper AWS-3 Signal Surrogate:** Alternatively, the reported data could be explained by presuming that the UMTS signal used to "simulate" the AWS-3 signal has unusually high out of band emissions that were also unusually broadband, somewhat like an ultra-wideband signal. The details of the roll-off characteristics of the AWS-3 simulated signal were not provided.

It is impossible *ex post facto* to determine what the best explanation is of the odd results shown in Figure 1. But the fact that the power needed varied by so little over this wide frequency range can only be explained by one of the two explanations above.

In either case, this data is not a reliable predictor of what should happen between a well engineered AWS-3 signal and a well designed AWS-1 receiver. Therefore, we use instead the ERA Technology ("ERA") data and Ofcom analysis to calculate the appropriate signal power as described below.

B. THE COMMISSION SHOULD ESTABLISH AWS-3 OUT-OF-BAND EMISSION LIMITS AT 49 +10 LOG (P)

M2Z has consistently explained that the AWS-3 service rules should not impose unduly burdensome technical limits in order to protect AWS-1 operations at unrealistic levels, or in scenarios that would almost never occur in practical operational settings for both bands. Instead, we have supported a statistical approach such as the approach applied by Ofcom.[18] The observed test results with an -85 dBm desired signal confirm the ERA data that formed the basis of Ofcom's conclusions. T-Mobile's own tests thus support the adoption of a more relaxed OOBE limit of 49 + 10 log (P).

The observed test results imply adjacent channel leakage ratio ("ACLR") levels consistent with those derived from the ERA testing on which Ofcom relied.[19] M2Z computed the effective ACLR for the data provided from the observed tests by calculating the ratio of the served signal power to the interfering adjacent channel power, and adjusting for the minimum on-tune desired-to-undesired (D/U) signal ratio required to support successful call initiation by the AWS-1 receiver under test. (Note also that call initiation failure is the threshold preferred by T-Mobile, and we applied a value of -13 dB D/U based on the test data.) We then compared these ACLR values to those measured for the five different UMTS devices tested by ERA and the values used by Ofcom. The results of the comparison with ERA data for the first adjacent

[18] Ofcom (UK), On the Impact of Interference from TDD Terminal Stations to FDD Terminal Stations in the 2.6 GHz Band, April 21, 2008 (http://www.ofcom.org.uk/consult/condocs/2ghzregsnotice/tech.pdf) ("Ofcom Order").
[19] ERA Technology, "Measurements of UTRA-FDD user equipment characteristics in the 2.1 GHz band," final report, April 2008. Document is available at: http://www.ofcom.org.uk/consult/condocs/2ghzregsnotice/.

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channel (*i.e.*, AWS-1 to AWS-3 frequency separation of 5 MHz) are shown in the figure, below.[20]

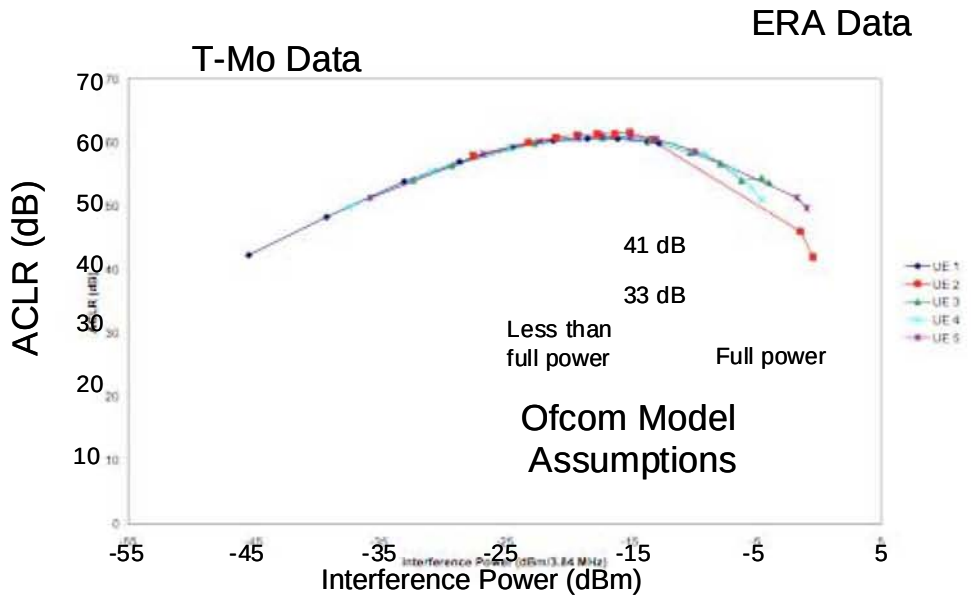

Figure 11: Measured ACLR of the interferer at the adjacent channel (+5 MHz)

Measured ACLR for AWS-1 Receivers at 1st Adjacent Channel Compared with Values Used in Ofcom Model

Figure 2: Analysis of Measured OOBE Performance Compared with Statistical Model Input

The value of ACLR is the figure used in statistical models applied by Ofcom to compute the effect of OOBE, where the higher values of ACLR represent lower OOBE levels in the receiver passband. There is general agreement that the OOBE are the dominant interference mechanism in nearby coupling situations, and thus ACLR performance is a key parameter in determining the probability of interference. Recognizing the importance of this parameter, we make the following observations when comparing the results of the observed tests with the parameters used in the Ofcom analysis:

1. Based on the figure above, it appears that the ACLR resulting from the observed test data is reasonably consistent with data measured by ERA.

2. Notwithstanding the ERA data, the Ofcom analysis chose to be more conservative and apply two values of ACLR for the first adjacent channel, as follows: 33 dB for full

[20] However, notwithstanding those tests by ERA, Ofcom chose to use some more conservative values; 31 dB and 41 dB for full power TDD and low power TDD, respectively.

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power operation of the interferer, and 41 dB for less than full power.[21] The test data values range from 45 dB to 52 dB for the first adjacent channel. Thus, all ACLR values resulting from test measured data that exceeds those assumed by Ofcom, and consequently the expected performance implied by the observed tests would lead to lower levels of predicted interference than those predicted in the Ofcom study.

Considering the fact that the tests indicate substantially better ACLR performance than assumed by Ofcom, and recognizing that the OOBE levels applied by Ofcom were based on a -19 dBm/MHz block edge mask (equivalent to a 49 + 10 log (P) limit), we assert that these observed tests would not only support the Ofcom conclusions, but would suggest that the statistically predicted interference is likely to substantially less than concluded by Ofcom. T-Mobile's own tests thus support the adoption of this more relaxed OOBE limit of 49 + 10 log (P).

C. AWS-3 HANDSETS COULD SAFELY OPERATE AT THE COMMISSION'S STANDARD POWER LIMIT OF +33 dBm

Notwithstanding this shortcoming in T-Mobile's adjacent channel interference tests, we remain convinced that the Commission can move forward with independent data (such as the results compiled by ERA and other sources) that would support a threshold of -10 dBm, leading to the same conclusion that we have offered before: an AWS-3 mobile terminal can be operated at +33 dBm with minimal risk of interference to adjacent block FDD operations.

As shown previously, the tests performed by T-Mobile in Seattle to measure receiver overload appear to be flawed. M2Z had hoped for a reliable test that would provide additional insight and end a debate here that has been long settled in Europe. Unfortunately, the observed tests used a broadband UMTS emission as the interference source, and made it impossible to distinguish between OOBE effects and receiver overload effects.

Second, nothing in the observed tests calls into question the -10 dBm level of the five handsets tested by ERA to determine the receiver blocking threshold adopted in the Ofcom analysis.[22] Ofcom concluded that because this threshold represented such good performance (based on actual receiver overload testing), the blocking by saturation effect was a negligible contributor to interference: the small amount of predicted interference was dominated by OOBE. Other contributors to the Commission's proceeding have taken similar positions.

Thus, the 33 dBm emission level established by Ofcom is directly applicable to AWS-3.

[21] Ofcom Order at 6-7.
[22] *Id.* at 8.

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IV. CONCLUSION

The Commission's June 2008 *Further Notice* articulated a complete set of technical rules to govern the use of the AWS-3 band to provide American consumers with new nationwide broadband service. After repeated calls for empirical testing from parties opposed to the new broadband service, the Commission agreed to observe T-Mobile's test earlier this month, but the results of the observed tests largely confirm the validity of the technical approach outlined by the Commission in the *Further Notice*. In fact, the tests show that the Commission's proposed rules for the AWS-3 band are actually more stringent than is necessary to protect adjacent licensees, and that they should be relaxed to ensure the delivery of effective two-way broadband services in the AWS-3 band. Accordingly, M2Z believes that AWS-3 TDD operations can coexist safely with FDD downlink operations in the AWS-1 band, using an out-of-band emission limit of 49 + 10 log (P). Moreover, nothing in the observed tests data invalidated Ofcom's exhaustive study of FDD/TDD operations, which led to the conclusion that AWS-3 devices can safely operate at the Commission's standard power limit of +33 dBm.

Sincerely,

Uzoma C. Onyeije

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